UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/712,003	11/14/2003	Yang-Lim Choi	Q77978	7801

23373 7590 03/06/2007

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER	
CHAI, LONGBIT	
ART UNIT	**PAPER NUMBER**
2131	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/06/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/712,003	CHOI ET AL.	
	Examiner	Art Unit	
	Longbit Chai	2131	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 September 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-36* is/are rejected.

7)☒ Claim(s) *35 and 36* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/22/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Applicant's claim for benefit of foreign priority under 35 U.S.C. 119 (a) – (d) is acknowledged.

The application is filed on 11/14/2003 but has a foreign priority application filed on 1/16/2003.

Claim Objection

2. Claims 35 and 36 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 7, 17, 24 and 31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7, 17, 24 and 31 recite the limitation "the sum of absolute difference information". There is insufficient antecedent basis for this limitation in the claims and thereby it is not clear what "absolute difference information" the Applicant is exactly referred to.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraph of 35 U.S.C. 102 that forms the basis for the rejections under this section made in this Office action:

> **A person shall be entitled to a patent unless –**
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 16, 30 and 36 are rejected under 35 U.S.C. 102(b) as being anticipated by Bellifemine et al. (U.S. Patent 6,122,320).

As per claim 16 and 30, Bellifemine teaches an apparatus for generating a random number, the apparatus comprising:

a content processor that receives an audio/video stream (Bellifemine: Column 1 Line 4 – 14), and generates and outputs statistical feature information of the audio/video stream (Bellifemine: Column 1 Line 4 – 7 and Column 1 Line 39 – 61: a reference vector (i.e. a reference macro-block or a 8 x 8 motion vector) can be considered as a statistical feature information because it is provided / outputted via a statistical manipulation process from the motion

estimation units that can minimize the cost function having an indication of the estimation error by means of a prediction with motion compensation starting from one or more past reference picture frames); and

a random number generator that receives the statistical feature information and generates a random number using the statistical feature information (Bellifemine: Column 3 Line 30 – 37 and Column 14 Line 4 – 15: the calculated mean absolute error between a current macro-block and a reference (best matched) macro-block is qualified as a random number).

As per claim 36, Bellifemine teaches a computer-readable recording medium on which a program is recorded to execute the method of claim 30 in a computer (Bellifemine: Column 7 Line 53 – 67).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1 – 6, 21 – 23 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bellifemine et al. (U.S. Patent 6,122,320), in view of Yoshino et al. (U.S. Patent 7,124,317).

As per claim 1 and 21, Bellifemine teaches an encryption apparatus comprising:

a content processor that receives an audio/video stream (Bellifemine: Column 1 Line 4 – 14), performs one or more predetermined processing operations on the audio/video stream, and generates and outputs predetermined data to be used for generating a random number (Bellifemine: Column 1 Line 4 – 7 and Column 1 Line 53 – 61: the motion estimation function is qualified as a predetermined processing operations on the audio/video stream and the "reference" macro-block (i.e. a 8 x 8 motion vector) that, in the reference picture frame, best matches the current macro-block as identified / outputted by motion estimation function is qualified as a predetermined data);

a random number generator that receives the predetermined data from the content processor and generates the random number (Bellifemine: Column 3 Line 30 – 37 and Column 14 Line 4 – 15: the mean absolute error between a current macro-block and a reference macro-block is qualified as a random number of statistical feature information).

However, Bellifemine does not teaches an encryption key generator that receives information comprising the random number and generates an encryption key using the information; and a content encryptor that encrypts the audio/video stream output from the content processor using the encryption key.

Yoshino teaches an encryption key generator that receives information comprising the random number and generates an encryption key using the information (Yoshino: Column 40 Line 46 – 48 and Column 1 Line 23 – 26: a

content key is created based on a random number for encrypting the digital content); and a content encryptor that encrypts the audio/video stream output from the content processor using the encryption key (Yoshino: Column 2 Line 13 – 19 and Column 1 Line 23 – 26: the encrypted content, for example, including such as audio (music), image, video and games on a DVD or CD).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Yoshino within the system of Bellifemine because (a) Bellifemine teaches processing a received audio/video stream and storing the information in a temporary storage when needed (Bellifemine: Column 1 Line 4 – 14 and Column 18 Line 8 – 9) and (b) Yoshino teaches preventing fraudulent acts on digital contents such as music, image, video, game, etc by storing the encrypted data in the storage medium such as a DVD or CD (Yoshino: Column 2 Line 13 – 19 and Column 1 Line 23 – 26).

As per claim 5, Bellifemine a modified teaches the content processor generates and outputs the predetermined data to be used to generate the random number, based on motion vector information that is generated during a motion estimation processing operation (Bellifemine: Column 1 Line 4 – 7 and Column 1 Line 39 – 61: during the motion estimation process).

As per claim 2 and 22, Bellifemine as modified teaches the content processor compresses the received audio/video stream as MPEG video (Bellifemine: Column 1 Line 4 – 10).

As per claim 3, Bellifemine as modified teaches the content processor generates the predetermined data based on statistical features of the audio/video stream that are generated when compressing the received audio/video stream as the MPEG video (Bellifemine: Column 1 Line 4 – 10 and Column 5 Line 18 – 30).

As per claim 4 and 23, Bellifemine as modified teaches the statistical features include at least one of color distribution information, motion estimation information, and noise estimation information of a macroblock that are generated when compressing the received audio/video stream as the MPEG video (Bellifemine: Column 1 Line 4 – 7 and Column 1 Line 39 – 61: the motion estimation information).

As per claim 6, Bellifemine as modified does not disclose expressly the statistical feature information are a least significant 1 bit of a motion vector that is generated during the motion estimation in a macroblock and then stored in a shift register and a plurality of other least significant 1 bits of motion vectors that are generated in subsequent macroblocks and then sequentially stored in the shift register, by shifting the shift register bit by bit, the stored least significant 1 bits being output when the generation of the random number is requested.

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Bellifemine to accommodate that the motion vector (MV) is generated in each macroblock and the least significant 1 bit of each of the MVs is sequentially stored in a shift register because Bellifemine teaches (a) Random vector generator GVC is based on the use of linear feedback shift registers and is arranged to supply a pseudo-Gaussian distribution of random numbers for each component of a vector by performing inversions and multiplications on a basic set of random numbers including motion vector macroblock (Bellifemine: Column 15 Line 51 – 56 and Column 4 Line 3 Line 30 – 37) and (b) Block CCE generates the control signals by exploiting the Least Significant Bits (LSB) of the motion vectors supplied by GV and configuration information (Bellifemine: Column 12 Line 54 – 57: i.e. a least significant 1 bit of a motion vector that is generated during the motion estimation in a macroblock and then stored in a register).

As per claim 35, Bellifemine as modified teaches a computer-readable recording medium on which a program is recorded to execute the method of claim 21 in a computer (Bellifemine: Column 7 Line 53 – 67).

6. Claims 7 – 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bellifemine et al. (U.S. Patent 6,122,320), in view of Yoshino et al. (U.S. Patent 7,124,317), and in view of Daly (U.S. Patent 5,150,433).

As per claim 7, Bellifemine as modified does not disclose expressly generating the random number, based on the sum of absolute difference information that is generated during a motion estimation processing operation.

Daly teaches generating the random number, based on the sum of absolute difference information that is generated during a motion estimation processing operation (Daly: Column 1 Line 38 – 42 and Column 2 Line 27 – 37).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Daly within the system of Bellifemine as modified because (a) Bellifemine teaches providing a mechanism for motion estimation in compressing and encoding digital video sequences (Bellifemine: Column 1 Line 4 – 14) and (b) Daly teaches providing a considerable improvement in image quality by detecting the presence of a high contrast edge within a block of image data (Daly: Column 1 Line 7 – 10 and Column 1 Line 51 – 60).

As per claim 8, Bellifemine as modified does not disclose expressly the predetermined data is a least significant 1 bit of the sum of absolute difference information that is generated during the motion estimation processing operation in a macroblock and then stored in a shift register and a plurality of other least

significant 1 bits of the sum of absolute difference information that are generated in subsequent macroblocks and then sequentially stored in the shift register, by shifting the shift register bit by bit, the stored least significant 1 bits being output when the generation of the random number is requested.

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Bellifemine to accommodate that the random number such as the sum of absolute difference information is generated in each macroblock and the least significant 1 bit of each of the MVs is sequentially stored in a shift register because Bellifemine teaches (a) Random vector generator GVC is based on the use of linear feedback shift registers and is arranged to supply a pseudo-Gaussian distribution of random numbers for each component of a vector by performing inversions and multiplications on a basic set of random numbers including motion vector macroblock (Bellifemine: Column 15 Line 51 – 56 and Column 4 Line 3 Line 30 – 37) and (b) Block CCE generates the control signals by exploiting the Least Significant Bits (LSB) of the motion vectors supplied by GV and configuration information (Bellifemine: Column 12 Line 54 – 57: i.e. a least significant 1 bit of a motion vector that is generated during the motion estimation in a macroblock and then stored in a register).

As per claim 9, Bellifemine as modified does not disclose expressly generating the random number, based on variance information that is generated during a Motion Compensated-Discrete Cosine Transform processing operation.

Daly teaches generating the random number, based on variance information that is generated during a Motion Compensated-Discrete Cosine Transform processing operation (Daly: Column 1 Line 42 – 50, Column 3 Line 65 – Column 4 Line 10 and Column 4 Line 35 – 38: a more sophisticated edge detector may be implemented by calculating the ratio of the variance of the low frequencies in the image block to the variance of all the frequencies of the block, with a high ratio indicating the presence of an edge. This variance ratio can be carried out in parallel with the compensated DCT (Discrete Cosine Transform) compression process (i.e. transformed from a two-dimensional array into a one-dimensional array), and the results employed in the course of determining the normalization factors).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Daly within the system of Bellifemine as modified because (a) Bellifemine teaches providing a mechanism for motion estimation in compressing and encoding digital video sequences (Bellifemine: Column 1 Line 4 – 14) and (b) Daly teaches providing a considerable improvement in image quality by detecting the presence of a high contrast edge within a block of image data (Daly: Column 1 Line 7 – 10 and Column 1 Line 51 – 60).

As per claim 10, Bellifemine as modified does not disclose expressly the predetermined data is a least significant 1 bit of variance information that is generated during the Motion Compensated-Discrete Cosine Transform and then stored in a shift register and a plurality of other least significant 1 bits of variance information that are generated subsequently and then sequentially stored in the shift register, by shifting the shift register bit by bit, the stored least significant 1 bits being output when the generation of the random number is requested.

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Bellifemine to accommodate that the random number such as variance information that is generated during a Motion Compensated-Discrete Cosine Transform is generated in each macroblock and the least significant 1 bit of each of the MVs is sequentially stored in a shift register because Bellifemine teaches (a) Random vector generator GVC is based on the use of linear feedback shift registers and is arranged to supply a pseudo-Gaussian distribution of random numbers for each component of a vector by performing inversions and multiplications on a basic set of random numbers including motion vector macroblock (Bellifemine: Column 15 Line 51 – 56 and Column 4 Line 3 Line 30 – 37) and (b) Block CCE generates the control signals by exploiting the Least Significant Bits (LSB) of the motion vectors supplied by GV and configuration information (Bellifemine: Column 12 Line 54 – 57: i.e. a least significant 1 bit of a motion vector that is generated during the motion estimation in a macroblock and then stored in a register).

7. Claims 11 – 13 and 26 – 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bellifemine et al. (U.S. Patent 6,122,320), in view of Yoshino et al. (U.S. Patent 7,124,317), and in view of Rajski et al. (U.S. Patent 6,353,842).

As per claim 11 and 26, Bellifemine as modified does not disclose expressly the random number generator performs a predetermined operation on the predetermined data received from the content processor and the random number, which is generated by the random number generator using a predetermined algorithm, to generate a new random number.

Rajski teaches the random number generator performs a predetermined operation on the predetermined data received from the content processor and the random number, which is generated by the random number generator using a predetermined algorithm, to generate a new random number (Rajski: Column 1 Line 16 – 18 / Line 25 – 30, Column 7 Line 17 – 30 and Column 8 Line 35 – 65: the random number is generated by performing XOR on the predetermined data and a previously generated random number that was generated using a linear feedback shift register (LFSR) and a Cellular Automata (CA) algorithm).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Rajski within the system of Bellifemine as modified because (a) Bellifemine teaches providing a method for compressing and encoding digital video sequences using a linear feedback shift registers (LFSR) to supply a pseudo-Gaussian distribution of random

numbers (Bellifemine: Column 15 Line 51 – 53) and (b) Rajski teaches providing an optimal solution in a synthesized linear finite state machines with a LFSR that can use not only fewer level of logic but also lower internal fan-out while provide the same output sequence as the original circuit (Rajski: Column 3 Line 25 – 29 and Column 3 Line 9 – 11).

As per claim 12, Bellifemine as modified teaches the predetermined operation is a Boolean XOR operation (Rajski: Column 7 Line 17 – 30 and Column 8 Line 54 – 65).

As per claim 13 and 27, Bellifemine as modified teaches the predetermined algorithm is one of a random number generating algorithm using a linear feedback shift register and a Cellular Automata algorithm (Rajski: Column 1 Line 16 – 18 / Line 25 – 30 and Column 8 Line 35 – 65).

8. Claims 14 – 15 and 28 – 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bellifemine et al. (U.S. Patent 6,122,320), in view of Yoshino et al. (U.S. Patent 7,124,317), and in view of Barton (U.S. Patent 5,912,972).

As per claim 14 and 28, Bellifemine as modified teaches the encryption key generator receives the random number generated by the random number generator (Yoshino: Column 40 Line 46 – 48 and Column 1 Line 23 – 26) and performs a predetermined operation on the random number (Yoshino: Column 19

Line 1 – 7: the XOR is qualified as a predetermined operation on the master key (i.e. random number) using ICV (Integrity Check Value) as identity information.

However, Bellifemine as modified does not disclose expressly the encryption key generator receives content identification information, storage identification information, and copy management control bit information in addition to the random number generated by the random number generator and performs a predetermined operation on the random number, the content identification information, the storage identification information, and the copy management control bit information to generate the encryption key.

Barton teaches the encryption key generator receives content identification information, storage identification information, and copy management control bit information in addition to the random number generated by the random number generator and performs a predetermined operation on the random number, the content identification information, the storage identification information, and the copy management control bit information to generate the encryption key (Barton: Column 2 Line 63 – 66 and Column 8 Line 60 – 62 & Yoshino: Column 19 Line 1 – 7: the meta data includes the information about the file permission, file type and application type is considered as the content identification information, the serial number is considered as the storage identification information and the validated license identification is considered as the copy management control bit information and the meta-data can be further used as an identification key).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Barton within the system of Bellifemine as modified because (a) Bellifemine teaches processing a received audio/video stream and storing the information in a temporary storage when needed (Bellifemine: Column 1 Line 4 – 14 and Column 18 Line 8 – 9) and (b) Barton teaches a method to enhance the authentication capability for audio / video / image data by providing a sequence number as part of meta-data and an identification key to assure the frames of digital content have not been deleted or altered (Barton: Column 4 Line 26 – 32, Column 1 Line 41 – 42 and Column 18 Line 8 – 9).

As per claim 15 and 29, Bellifemine as modified teaches the predetermined operation is one of a Boolean XOR operation that is performed on all bits of the random number, the content identification information, the storage identification information, and the copy management control bit information and a Boolean XOR operation that is performed on predetermined random bits of the random number, the content identification information, the storage identification information, and the copy management control bit information (Barton: Column 2 Line 63 – 66 and Column 8 Line 60 – 62 & Yoshino: Column 19 Line 1 – 7).

9. Claims 17, 19 – 20, 31 and 33 – 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bellifemine et al. (U.S. Patent 6,122,320), and in view of Daly (U.S. Patent 5,150,433).

As per claim 17 and 31, Bellifemine does not disclose expressly the statistical feature information is one of motion vector information that is generated during a motion estimation, the sum of absolute difference information that is generated during the motion estimation, and variance information that is generated during a Motion Compensated-Discrete Cosine Transform.

Daly teaches the statistical feature information is one of motion vector information that is generated during a motion estimation, the sum of absolute difference information that is generated during the motion estimation (Daly: Column 1 Line 38 – 42 and Column 2 Line 27 – 37), and variance information that is generated during a Motion Compensated-Discrete Cosine Transform (Daly: Column 1 Line 42 – 50, Column 3 Line 65 – Column 4 Line 10 and Column 4 Line 35 – 38: a more sophisticated edge detector may be implemented by calculating the ratio of the variance of the low frequencies in the image block to the variance of all the frequencies of the block, with a high ratio indicating the presence of an edge. This variance ratio can be carried out in parallel with the compensated DCT (Discrete Cosine Transform) compression process (i.e. transformed from a two-dimensional array into a one-dimensional array), and the results employed in the course of determining the normalization factors).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Daly within the system of Bellifemine because (a) Bellifemine teaches providing a mechanism for motion estimation in compressing and encoding digital video sequences (Bellifemine: Column 1 Line 4 – 14) and (b) Daly teaches providing a considerable

improvement in image quality by detecting the presence of a high contrast edge within a block of image data (Daly: Column 1 Line 7 – 10 and Column 1 Line 51 – 60).

As per claim 19 and 33, Bellifemine does not disclose expressly the statistical feature information are a least significant 1 bit of the sum of absolute difference information that is generated during motion estimation in a macroblock and then stored in a shift register and a plurality of other least significant 1 bits of the sum of absolute difference information that are generated in subsequent macroblocks and then sequentially stored in the shift register, by shifting the shift register bit by bit, the stored least significant 1 bits being output when the generation of the random number is requested.

Daly teaches the statistical feature information is one of motion vector information that is generated during a motion estimation, the sum of absolute difference information that is generated during the motion estimation (Daly: Column 1 Line 38 – 42 and Column 2 Line 27 – 37).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Daly within the system of Bellifemine because (a) Bellifemine teaches providing a mechanism for motion estimation in compressing and encoding digital video sequences (Bellifemine: Column 1 Line 4 – 14) and (b) Daly teaches providing a considerable improvement in image quality by detecting the presence of a high contrast edge

within a block of image data (Daly: Column 1 Line 7 – 10 and Column 1 Line 51 – 60).

Furmore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Bellifemine to accommodate that the random number such as the sum of absolute difference information is generated in each macroblock and the least significant 1 bit of each of the MVs is sequentially stored in a shift register because Bellifemine teaches (a) Random vector generator GVC is based on the use of linear feedback shift registers and is arranged to supply a pseudo-Gaussian distribution of random numbers for each component of a vector by performing inversions and multiplications on a basic set of random numbers including motion vector macroblock (Bellifemine: Column 15 Line 51 – 56 and Column 4 Line 3 Line 30 – 37) and (b) Block CCE generates the control signals by exploiting the Least Significant Bits (LSB) of the motion vectors supplied by GV and configuration information (Bellifemine: Column 12 Line 54 – 57: i.e. a least significant 1 bit of a motion vector that is generated during the motion estimation in a macroblock and then stored in a register).

As per claim 20 and 34, Bellifemine does not disclose expressly the statistical feature information are a least significant 1 bit of variance information that is generated during the Motion Compensated-Discrete Cosine Transform and then stored in a shift register and a plurality of other least significant 1 bits of variance information that are generated subsequently and then sequentially

stored in the shift register, by shifting the shift register bit by bit, the stored least significant 1 bits being output when the generation of the random number is requested.

Daly teaches variance information that is generated during a Motion Compensated-Discrete Cosine Transform (Daly: Column 1 Line 42 – 50, Column 3 Line 65 – Column 4 Line 10 and Column 4 Line 35 – 38: a more sophisticated edge detector may be implemented by calculating the ratio of the variance of the low frequencies in the image block to the variance of all the frequencies of the block, with a high ratio indicating the presence of an edge. This variance ratio can be carried out in parallel with the compensated DCT (Discrete Cosine Transform) compression process (i.e. transformed from a two-dimensional array into a one-dimensional array), and the results employed in the course of determining the normalization factors).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Daly within the system of Bellifemine because (a) Bellifemine teaches providing a mechanism for motion estimation in compressing and encoding digital video sequences (Bellifemine: Column 1 Line 4 – 14) and (b) Daly teaches providing a considerable improvement in image quality by detecting the presence of a high contrast edge within a block of image data (Daly: Column 1 Line 7 – 10 and Column 1 Line 51 – 60).

Furmore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Bellifemine to accommodate that

the random number such as variance information that is generated during a Motion Compensated-Discrete Cosine Transform is generated in each macroblock and the least significant 1 bit of each of the MVs is sequentially stored in a shift register because Bellifemine teaches (a) Random vector generator GVC is based on the use of linear feedback shift registers and is arranged to supply a pseudo-Gaussian distribution of random numbers for each component of a vector by performing inversions and multiplications on a basic set of random numbers including motion vector macroblock (Bellifemine: Column 15 Line 51 – 56 and Column 4 Line 3 Line 30 – 37) and (b) Block CCE generates the control signals by exploiting the Least Significant Bits (LSB) of the motion vectors supplied by GV and configuration information (Bellifemine: Column 12 Line 54 – 57: i.e. a least significant 1 bit of a motion vector that is generated during the motion estimation in a macroblock and then stored in a register).

10. Claims 18 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bellifemine et al. (U.S. Patent 6,122,320).

As per claim 18 and 32, Bellifemine does not disclose expressly the statistical feature information are a least significant 1 bit of a motion vector that is generated during the motion estimation in a macroblock and then stored in a shift register and a plurality of other least significant 1 bits of motion vectors that are generated in subsequent macroblocks and then sequentially stored in the shift

register, by shifting the shift register bit by bit, the stored least significant 1 bits being output when the generation of the random number is requested.

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Bellifemine to accommodate that the motion vector (MV) is generated in each macroblock and the least significant 1 bit of each of the MVs is sequentially stored in a shift register because Bellifemine teaches (a) Random vector generator GVC is based on the use of linear feedback shift registers and is arranged to supply a pseudo-Gaussian distribution of random numbers for each component of a vector by performing inversions and multiplications on a basic set of random numbers including motion vector macroblock (Bellifemine: Column 15 Line 51 – 56 and Column 4 Line 3 Line 30 – 37) and (b) Block CCE generates the control signals by exploiting the Least Significant Bits (LSB) of the motion vectors supplied by GV and configuration information (Bellifemine: Column 12 Line 54 – 57: i.e. a least significant 1 bit of a motion vector that is generated during the motion estimation in a macroblock and then stored in a register).

11. Claims 24 – 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bellifemine et al. (U.S. Patent 6,122,320), in view of Yoshino et al. (U.S. Patent 7,124,317), and in view of Daly (U.S. Patent 5,150,433)

As per claim 24, Bellifemine does not disclose expressly the predetermined data to be used for generating the random number is generated

and output using at least one of motion vector information that is generated during a motion estimation, the sum of absolute difference information that is generated during the motion estimation, and variance information that is generated during a Motion Compensated-Discrete Cosine Transform.

Daly teaches the predetermined data to be used for generating the random number is generated and output using at least one of motion vector information that is generated during a motion estimation, the sum of absolute difference information that is generated during the motion estimation (Daly: Column 1 Line 38 – 42 and Column 2 Line 27 – 37), and variance information that is generated during a Motion Compensated-Discrete Cosine Transform (Daly: Column 1 Line 42 – 50, Column 3 Line 65 – Column 4 Line 10 and Column 4 Line 35 – 38: a more sophisticated edge detector may be implemented by calculating the ratio of the variance of the low frequencies in the image block to the variance of all the frequencies of the block, with a high ratio indicating the presence of an edge. This variance ratio can be carried out in parallel with the compensated DCT (Discrete Cosine Transform) compression process (i.e. transformed from a two-dimensional array into a one-dimensional array), and the results employed in the course of determining the normalization factors).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Daly within the system of Bellifemine as modified because (a) Bellifemine teaches providing a mechanism for motion estimation in compressing and encoding digital video sequences (Bellifemine: Column 1 Line 4 – 14) and (b) Daly teaches providing a

considerable improvement in image quality by detecting the presence of a high contrast edge within a block of image data (Daly: Column 1 Line 7 – 10 and Column 1 Line 51 – 60).

As per claim 25, Bellifemine does not disclose expressly in the generating and outputting of the predetermined data, one of a least significant 1 bit of motion vector information that are generated in each macroblock during the motion estimation, a least significant 1 bit of the sum of absolute difference information that are generated in each macroblock during the motion estimation, and a least significant 1 bit of variance information that is generated during a Motion Compensated-Discrete Cosine Transform in each macroblock, is sequentially stored in the shift register, by shifting a shift register of a predetermined size, and output when the generation of the random number is requested.

However, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Bellifemine to accommodate that the random number such as the sum of absolute difference information and variance information that is generated during a Motion Compensated-Discrete Cosine Transform is generated in each macroblock and the least significant 1 bit of each of the MVs is sequentially stored in a shift register because Bellifemine teaches (a) Random vector generator GVC is based on the use of linear feedback shift registers and is arranged to supply a pseudo-Gaussian distribution of random numbers for each component of a vector by performing inversions and multiplications on a basic set of random numbers including motion vector macroblock (Bellifemine: Column 15 Line 51 – 56 and Column 4 Line 3 Line 30 – 37) and (b) Block CCE generates the control signals by exploiting the Least

Significant Bits (LSB) of the motion vectors supplied by GV and configuration information (Bellifemine: Column 12 Line 54 – 57: i.e. a least significant 1 bit of a motion vector that is generated during the motion estimation in a macroblock and then stored in a register).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Longbit Chai whose telephone number is 571-272-3788. The examiner can normally be reached on Monday-Friday 9:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ayaz R. Sheikh can be reached on 571-272-3795. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Longbit Chai

Longbit Chai, Ph.D.
Patent Examiner
Art Unit 2131
2/8/2007